

Final
Site-Specific Field Sampling Plan and
Site-Specific Safety and Health Plan Attachments
Range 24 A Fog Oil Drum Storage (Parcel 88)
Range 24A Multi-Purpose Range (Parcel 108)
Smoke Area BVZ (Parcel 124), Smoke Area S (Parcel 106)
Smoke Area R (Parcel 105), Stump Dump (Parcel 82)
Old Incinerator Building 5710 (Parcel 125)
Former Smoke Area Choccolocco Corridor (Parcel 107)
Former Smoke Area South Slope Morgan Mountain
(Parcel 159)

Fort McClellan
Calhoun County, Alabama

Delivery Order CK005
Contract No. DACA21-96-D-0018
IT Project No. 774645

October 1998

Revision 1

Site-Specific Field Sampling Plans

Range 24A Fog Oil Drum Storage (Parcel 88)

Range 24A Multi-Purpose Range (Parcel 108)

Smoke Area BVZ (Parcel 124)

Smoke Area S (Parcel 106)

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Stump Dump (Parcel 82)

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Former Smoke Area South Slope Morgan Mountain (Parcel 159)

Site Investigation
Final
Site-Specific Field Sampling Plan Attachment
for the Range 24A, Fog Oil Drum Storage, Parcel 88(6)

Fort McClellan
Calhoun County, Alabama

Prepared for:

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List of Acronyms

ADEM	Alabama Department of Environmental Management
CLP	Contract Laboratory Program
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
COC	chain of custody
CSEM	conceptual site exposure model
DOD	U.S. Department of Defense
DQO	data quality objective
EBS	environmental baseline survey
EPA	U.S. Environmental Protection Agency
ESE	Environmental Science and Engineering, Inc.
FTMC	Fort McClellan
GPS	global positioning system
IDW	investigation-derived waste
IT	IT Corporation
NPDES	National Pollution Discharge Elimination System
OWS	oil/water separator
PID	photoionization detector
PSSC	potential site-specific chemicals
QA/QC	quality assurance/quality control
QAP	installation-wide quality assurance plan
SAP	installation-wide sampling and analysis plan
SFSP	site-specific field sampling plan
SHP	installation-wide safety and health plan
SI	site investigation
SSHP	site-specific safety and health plan
TCL	target compound list
USACE	U.S. Army Corps of Engineers
UST	underground storage tank
WP	installation-wide work plan

Executive Summary

In accordance with Contract No. DACA21-96-D-0018, Delivery Order CK005, IT Corporation (IT) will conduct site investigation activities at the Range 24A, Fog Oil Drum Storage, Parcel 88(6), at Fort McClellan, Calhoun County, Alabama, to determine the presence or absence of potential site-specific chemicals (PSSC) at this site. The purpose of this site-specific field sampling plan (SFSP) is to provide technical guidance for sampling activities at the Range 24A, Fog Oil Drum Storage, Parcel 88(6).

The Range 24A, Fog Oil Drum Storage facility is located at the western end of Range 24A in the southeastern area of the Main Post (Figure 1-1). The storage area is constructed as a bermed concrete pad (approximately 60 by 60 feet) that slopes to floor drains (sumps) connected to an oil/water separator (OWS) and an underground storage tank (UST) that collects spilled oil and precipitation. The facility covers an area of less than 1 acre. A 5-foot-high concrete berm (wall) surrounds most of the concrete storage area. This facility has a capacity to store approximately three hundred 55-gallon drums (Roy F. Weston, 1990). The drums are stacked on their sides in rows. Oily stains were noted on soil outside the drum storage area (Environmental Science and Engineering, Inc. [ESE], 1998). FTMC Directorate of Environment personnel report that a large volume of fog oil has been released over the years at training and storage areas within Range 24A, including the drum storage area (ESE, 1998).

The OWS for Range 24A, Fog Oil Drum Storage, discharges into nearby surface waters, north of the facility, under one of FTMC's National Pollution Discharge Elimination System (NPDES) permits. The discharge permit currently in effect for this facility (Outfall 001), NPDES No. AL0055999, was last issued in 1993 (ESE, 1998). A review of the FTMC Noncompliance Notification Forms submitted to ADEM revealed violations for discharges of total organic carbon and lead for Outfall 001. After the permit was modified to correct errors, it was discovered that previous permit violations had not occurred. Quarterly effluent sampling is conducted by the FTMC DOE (ESE, 1998).

The Range 24A, Fog Oil Drum Storage, Parcel 108(7) falls within the "Possible Explosive Ordnance Impact Area" shown on Plate 10 of the FTMC Archive Search Report, Maps (USACE, 1998a). Therefore, IT will conduct unexploded ordnance (UXO) avoidance activities, including surface sweeps and downhole surveys of soil borings.

Specifically, IT will collect four surface soil samples, four subsurface soil samples, four groundwater samples, three surface water, three sediment samples, and one depositional soil sample at this site. Potential contaminant sources at the Range 24A, Fog Oil Drum Storage, Parcel 88(6) site include fog oil and other petroleum products (gasoline, diesel, oils and lubricants) and possibly metals. Chemical analyses of the samples collected during the field program will include volatile organic compounds, semivolatile organic compounds, and metals. Results from these analyses will be compared with site-specific screening levels specified in the installation-wide work plan (WP) and regulatory agency guidelines.

This SFSP attachment to the installation-wide sampling and analysis plan (SAP) for the Range 24A, Fog Oil Drum Storage, Parcel 88(6), will be used in conjunction with the site-specific safety and health plan (SSHP), WP, the habitat-specific screening ecological risk assessment work plan and SAP. The SAP includes the installation-wide safety and health plan, waste management plan, and quality assurance plan. Site-specific hazard analyses are included in the SSHP.

1.0 Project Description

1.1 Introduction

The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the site investigation (SI) of Range 24A, Fog Oil Drum Storage, Parcel 88(6), under Delivery Order CK005, Contract No. DACA21-96-D-0018.

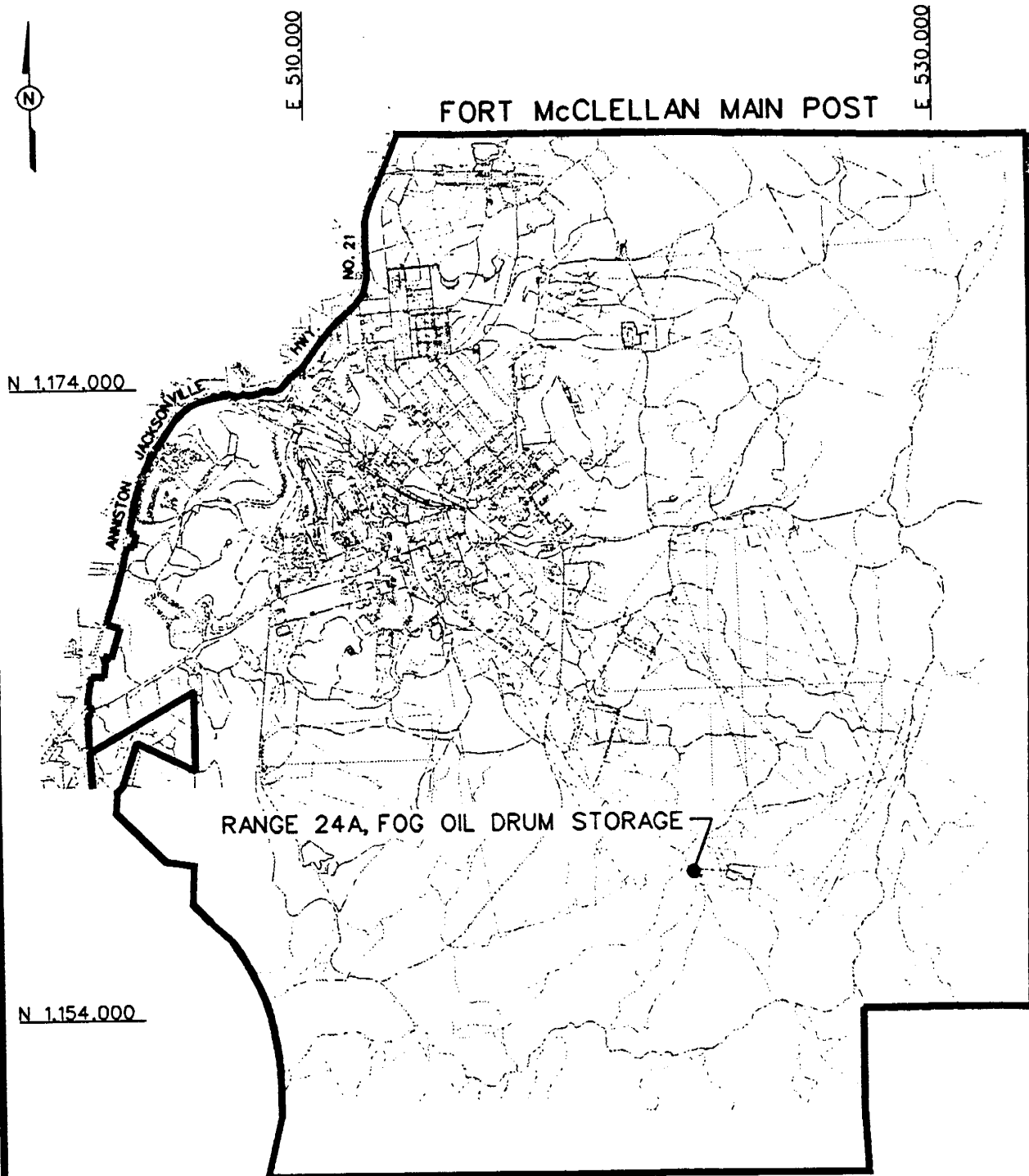
This site-specific field sampling plan (SFSP) attachment to the installation-wide sampling and analysis plan (SAP) (IT, 1998a) for FTMC, Calhoun County, Alabama, has been prepared to provide technical guidance for sample collection and analysis at Range 24A, Fog Oil Drum Storage, Parcel 88(6). The SFSP will be used in conjunction with the site-specific safety and health plan (SSHP) developed for Range 24A, Fog Oil Drum Storage, and the installation-wide work plan (WP) (IT, 1998b), the habitat-specific screening ecological risk assessment work plan, and SAP. The SAP includes the installation-wide safety and health plan (SHP), waste management plan, and installation-wide quality assurance plan (QAP).

1.2 Site Description

The Range 24A, Fog Oil Drum Storage facility is located at the western end of Range 24A in the southeastern area of the Main Post (Figure 1-1). The storage area is constructed as a bermed concrete pad (approximately 60 by 60 feet) that slopes to floor drains (sump) connected to an oil/water separator (OWS) and an underground storage tank (UST) that collects spilled oil and precipitation. The facility covers an area of less than 1 acre (Figure 1-1). A 5-foot-high concrete berm (wall) surrounds most of the concrete drum storage area. This facility has a capacity to store approximately three hundred 55-gallon drums (Roy F. Weston, 1990). The drums are stacked on their sides in rows. Oily stains were noted on soil outside the drum storage area (Environmental Science and Engineering, Inc. [ESE], 1998). FTMC Directorate of Environment personnel report that a large volume of fog oil has been released over the years at training and storage areas within Range 24A, and that an oil sheen has been present in a low-lying area just north of the road (ESE, 1998).

Seams in the bottom of the storage area have required resealing, and some oil has apparently leaked to underlying soils. Soil at the OWS outfall area was also recorded as stained (ESE,

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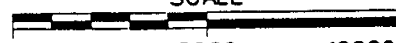


LEGEND:

 FORT McCLELLAN BOUNDARY

FIGURE 1-1
SITE LOCATION MAP
RANGE 24A, FOG OIL DRUM STORAGE
PARCEL 88(6)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

SCALE

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 INTERNATIONAL
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CORPORATION

1998). The volume of oil released at the storage sites and at training sites is unknown; however, surface contamination has been observed (ESE, 1998).

The OWS for Range 24A, Fog Oil Drum Storage discharges into nearby surface waters north of the facility under one of FTMC's National Pollution Discharge Elimination System (NPDES) permits. The discharge permit currently in effect for this facility (Outfall 001), NPDES No. AL0055999, was last issued in 1993 (ESE, 1998). A review of the FTMC Noncompliance Notification Forms submitted to ADEM revealed violations for discharges of total organic carbon and lead for Outfall 001. After the permit was modified to correct errors, it was discovered that previous permit violations had not occurred. Quarterly effluent sampling is conducted by the FTMC DOE (ESE, 1998).

Range 24A, Fog Oil Drum Storage, Parcel 88(6) site falls within the "Possible Explosive Ordnance Impact Area" shown on Plate 10 of the FTMC Archive Search Report, Maps (USACE, 1998a). Therefore, IT will conduct unexploded ordnance (UXO) avoidance activities, including surface sweeps and downhole surveys of soil borings.

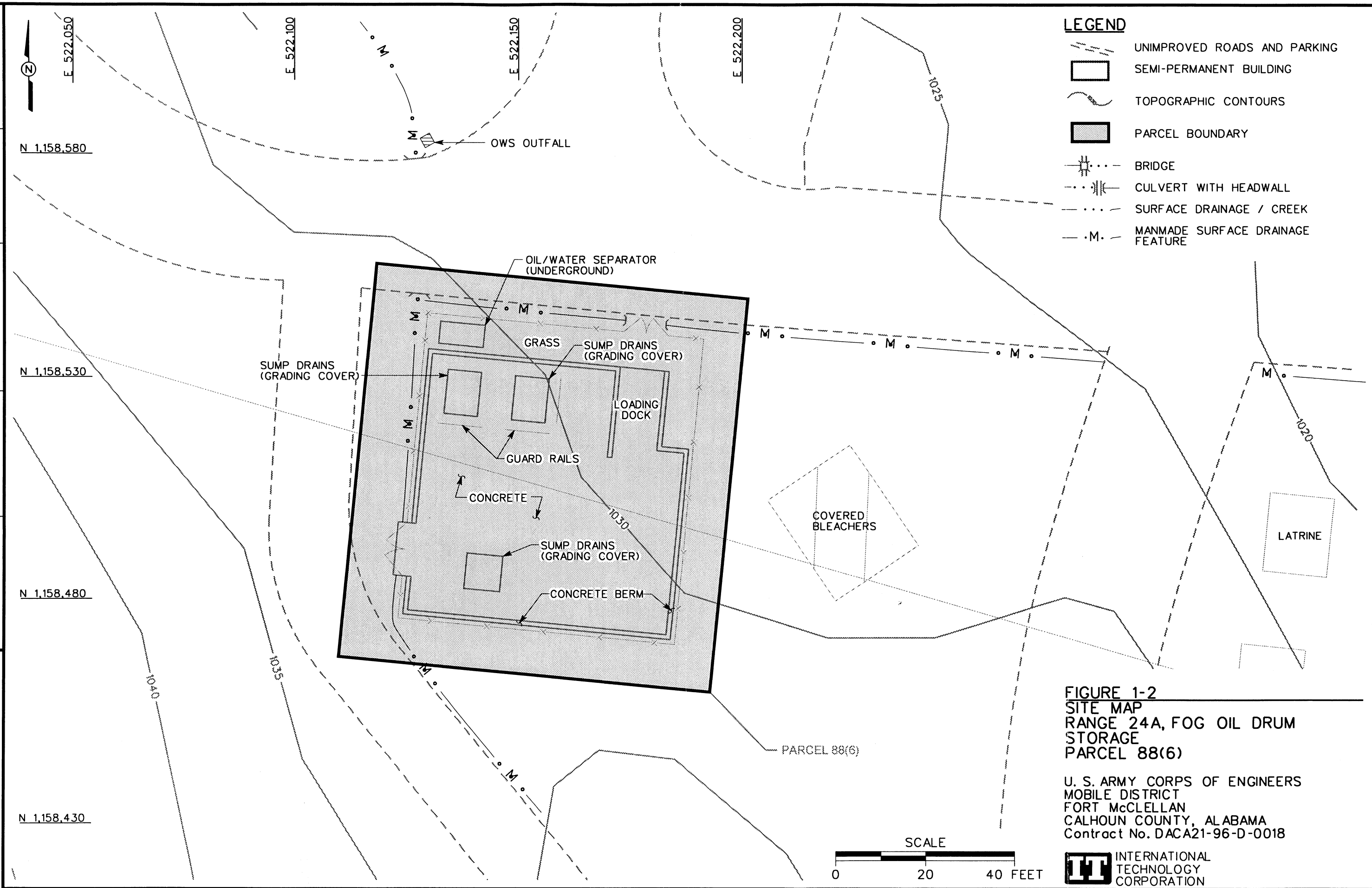
The site elevation at this site is approximately 1,030 feet. The depth to bedrock typically ranges from 2 feet to greater than 10 feet. The soils found at this site are composed of the Anniston and Allen Series soils. The depth to the water table for this series is usually greater than 20 feet. An intermittent stream flows north along the west side of the facility to the South Branch of Cane Creek. Shallow groundwater direction is probably controlled by the topography, and most likely flows to the north (downgradient) (Figure 1-2).

The Anniston and Allen Series of soils consists of strongly acid, deep, well drained soils that have developed in old local alluvium. The parent material washed from the adjacent higher-lying Linker, Muskingum, Enders, and Montevallo soils, which developed from weathered sandstone, shale, and quartzite. These sites contain sandstone and quartzite gravel and cobbles, which measure as much as 8 inches in diameter on the surface and throughout the soil.

Soils at this site fall into the Anniston and Allen stony loams, 10 to 25 percent slopes, eroded (AcB2). The mapping unit has strong slopes, little erosion, and contains stones 3 to 8 inches in diameter. The color of the surface soil, a stony loam approximately 4 to 8 inches thick, ranges from very dark brown to dark grayish-brown. At a depth of about 10 inches, the series grades into a dark-red or dark reddish-brown, stony, fine sandy clay loam. The alluvium ranges in thickness from 2 feet to more than 8 feet. Infiltration and runoff are medium, permeability is

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moderate, and the capacity for available moisture is high. Organic matter is moderately low (U.S. Department of Agriculture, 1961).

1.3 Scope of Work

The scope of work, for activities associated with the SI at this site, specified by the statement of work (USACE, 1998b), includes the following tasks:

- Develop the SFSP attachment.
- Develop the SSHP attachment.
- Conduct a surface and near surface unexploded ordnance (UXO) survey over all areas to be included in the sampling effort.
- Provide downhole UXO support for all intrusive drilling to determine buried downhole hazards.
- Collect four surface soil samples, four subsurface soil samples, four groundwater samples, three surface water samples, three sediment samples, and one depositional soil sample to determine if potential site-specific chemicals (PSSC) are present at the Range 24A, Fog Oil Drum Storage site and to provide data to determine any future planned corrective measures and closure activities.

At completion of the field activities and sample analyses, draft and final SI summary reports will be prepared in accordance with current U.S. Environmental Protection Agency (EPA) Region IV and the Alabama Department of Environmental Management (ADEM) requirements.

2.0 Summary of Existing Environmental Studies

ESE conducted an environmental baseline survey (EBS) to document current environmental conditions of all FTMC property (ESE, 1998). The study identified sites that, based on available information, have no history of contamination and comply with U.S. Department of Defense (DOD) guidance on fast track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by seven criteria.

1. Areas where no storage, release, or disposal (including migration) has occurred.
2. Areas where only storage has occurred.
3. Areas of contamination below action levels.
4. Areas where all necessary remedial actions have been taken.
5. Areas of known contamination with removal and/or remedial action underway.
6. Areas of known contamination where required response actions have not been taken.
7. Areas that are not evaluated or require further evaluation.

The EBS was conducted in accordance with the Community Environmental Response Facilitation Act (CERFA) (CERFA-Public Law 102-426) protocols and DOD policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, ADEM, EPA Region IV, and Calhoun County, as well as a database search of Comprehensive Environmental Response, Compensation, and Liability Act-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historic maps and aerial photographs were reviewed to document historic land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels. There were not any investigations identified that were conducted at the Fog Oil Storage facility.

Range 24A, Fog Oil Drum Storage is identified as a Category 6 CERFA site. This CERFA site is a parcel where fog oil was stored and reportedly released onto the site or to the environment, and/or were disposed on the site property. The Fog Oil Drum Storage facility lacks adequate

documentation and, therefore, requires additional evaluation to determine the environmental condition of the parcel.

3.0 Site-Specific Data Quality Objectives

3.1 Overview

The data quality objectives (DQO) process is followed to establish data requirements. This process ensures that the proper quantity and quality of data are generated to support the decision-making process associated with the action selection for the Range 24A, Fog Oil Drum Storage site. This section incorporates the components of the DQO process described in the EPA publication EPA 540-R-93-071, *Data Quality Objectives Process for Superfund, Interim Final Guidance* (EPA, 1993). The DQO process as applied to the Range 24A, Fog Oil Drum Storage site is described in more detail in Sections 3.2 and 4.3 of the WP. Table 3-1 provides a summary of the factors used to determine the appropriate quantity of samples, the procedures necessary to meet the objectives of the SI, and to establish a basis for future action at this site.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Chapter 4.0 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah (CESAS) Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard copy data packages by the laboratory using Contract Laboratory Program (CLP)-like forms. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

3.2 Data Users and Available Data

The intended data users and available data related to the SI at the Range 24A, Fog Oil Drum Storage site, presented in Table 3-1, have been used to formulate a conceptual site exposure model (CSEM) presented in Section 3.3. This CSEM was developed to support the preparation of this SFSP, which is necessary to meet the objectives of these activities and to establish a basis for future action at the site. The data users for the data and information generated during field activities are primarily the EPA, USACE, ADEM, FTMC, and the USACE supporting contractors. This SFSP, along with the necessary companion documents, has been designed to provide the regulatory agencies with sufficient detail to reach a determination as to the adequacy of the scope of work. The program has also been designed to provide the level of defensible data and information required to confirm or rule out the existence of residual PSSC in the site media.

Table 3-1

**Summary of Data Quality Objectives
Range 24A, Fog Oil Drum Storage, Parcel 88(6)
Fort McClellan, Calhoun County, Alabama**

Potential Data Users	Available Data	Conceptual Site Model	Media of Concern	Data Uses and Objectives	Data Types	Analytical Level	Data Quantity
EPA, ADEM USACE, DOD FTMC, IT Corporation Other Contractors Possible future land users	None available	<u>Contaminant Source</u> Fog oil drum storage facility,	<u>Surface soil</u>	SI to confirm the presence of PSSC in the site media	<u>Surface soil</u> TCL VOCs, TCL SVOCs, TAL Metals	Definitive data in CESAS Level B data packages	4 direct-push soil samples + QC
		<u>Migration Pathways</u> Dust emissions and volatilization from soil to ambient air.	<u>Subsurface Soil</u>		<u>Subsurface Soil</u> TCL VOCs, TCL SVOCs, TAL Metals	Definitive data in CESAS Level B data packages	4 direct-push soil samples + QC
		Infiltration to subsurface soil.	<u>Groundwater</u>	Definitive quality data for future decision making	<u>Groundwater</u> TCL VOCs, TCL SVOCs, TAL Metals	Definitive data in CESAS Level B data packages	4 direct-push groundwater samples + QC
		Infiltration and leaching to groundwater.	<u>Surface Water</u>		<u>Surface Water</u> TCL VOCs, TCL SVOCs, TAL Metals	Definitive data in CESAS Level B data packages	3 surface water sample + QC
		Groundwater discharge to the surface.	<u>Sediment</u>		<u>Sediment</u> TCL VOCs, TCL SVOCs, TAL Metals, TOC, Grain Size	Definitive data in CESAS Level B data packages	3 sediment sample + QC
		Erosion and runoff to surface water and sediment.	<u>Depositional Soil</u>		<u>Depositional Soil</u> TCL VOCs, TCL SVOCs, TAL Metals	Definitive data in CESAS Level B data packages	1 depositional sample + QC
		<u>Potential Receptors</u> Groundskeeper (current and future) Construction worker (current and future) Resident (future)					
		<u>PSSC</u> Fog oil, other petroleum products; possibly solvents and metals					

ADEM - Alabama Department of Environmental Management.
CESAS - Corps of Engineers South Atlantic Savannah.
DOD - U.S. Department of Defense.
EPA - U.S. Environmental Protection Agency.
FTMC - Fort McClellan.
PSSC - Potential site-specific chemical.
QC - Quality control.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target Compound list.
TOC - Total organic carbon.
USACE - U.S. Army Corps of Engineers.
VOC - Volatile organic compound.

3.3 Conceptual Site Exposure Model

The CSEM provides the basis for identifying and evaluating the potential risks to human health in the risk assessment. Graphically presenting possible pathways by which a potential receptor may be exposed, including sources, release and transport pathways, and exposure routes, facilitates consistent and comprehensive evaluation of risk to human health, and helps to ensure that potential pathways are not overlooked. The elements necessary to construct a complete exposure pathway and develop the CSEM include:

- Source (i.e., contaminated environmental) media
- Contaminant release mechanisms
- Contaminant transport pathways
- Receptors
- Exposure pathways.

Contaminant release mechanisms and transport pathways are not relevant for direct receptor contact with a contaminated source medium.

Potential contamination located on Range 24A, Fog Oil Drum Storage, Parcel 88(6) is due to the use of this area as a drum storage facility for fog oil used in smoke training. As detailed in Section 1.2, the drum storage area is constructed as a bermed concrete pad that slopes to a floor drain connected to an OWS and a UST that collects spilled oil and precipitation. Oily stains were noted on soil outside the drum storage area (Weston, 1990). Seams in the bottom of the storage area have required resealing, and some oil has apparently leaked to underlying soils. The OWS outfall area was also stained. Parcel 88(6) is located at the western end of Range 24A in the southeastern area of the Main Post. An intermittent stream flows north along the west side of the facility to the South Branch of Cane Creek. It is assumed that releases of potential contaminants are restricted to surface soil, subsurface soil, and surface water. The OWS has the potential to discharge contaminants into nearby surface waters. Potential contaminant transport pathways include dust emissions and volatilization from soil to ambient air, infiltration to subsurface soil, infiltration and leaching to groundwater, discharge of groundwater to the surface, erosion and runoff to the surface water and sediment, and volatilization from surface water.

The current site usage is best described as open space industrial, and probably not safe for public access until the site has undergone remediation because of the potential for UXO. Plausible receptors under current site usage include the groundskeeper and construction worker.

Future plans call for this site to become part of the Remediation Range, which will eventually be conveyed to the U.S. Fish and Wildlife Service for use as a National Wildlife Refuge (FTMC,

1997). The plausible receptors for the future site-use scenario include those identified under current land use and the recreational site user and the residential scenarios. The contaminant release and transport mechanisms, source and exposure media, receptors and exposure pathways are summarized in Figure 3-1 and Table 3-1.

Assessment of potential ecological risk associated with sites or parcels (e.g., surface water and sediment sampling, specific ecological assessment methods, etc.) will be addressed in a separate document to be issued as the habitat-specific screening ecological risk assessment work plan.

3.4 Decision-Making Process, Data Uses, and Needs

The decision-making process consists of a seven-step process that is presented in detail in Sections 3.2 and 4.3 of the WP and will be followed during the SI at the Range 24A, Fog Oil Drum Storage site. Data uses and needs are summarized in Table 3-1.

3.4.1 Risk Evaluation

Confirmation of contamination at Range 24A, Fog Oil Drum Storage, Parcel 88(6) will be based on comparing detected site chemicals of potential concern to site-specific screening levels developed in the WP. EPA definitive data with CESAS Level B data packages will be used to achieve detection limits sufficient to determine whether or not the established guidance criteria are exceeded in site media. Definitive data will be adequate for confirming the presence of site contamination and for supporting a feasibility study and risk assessment.

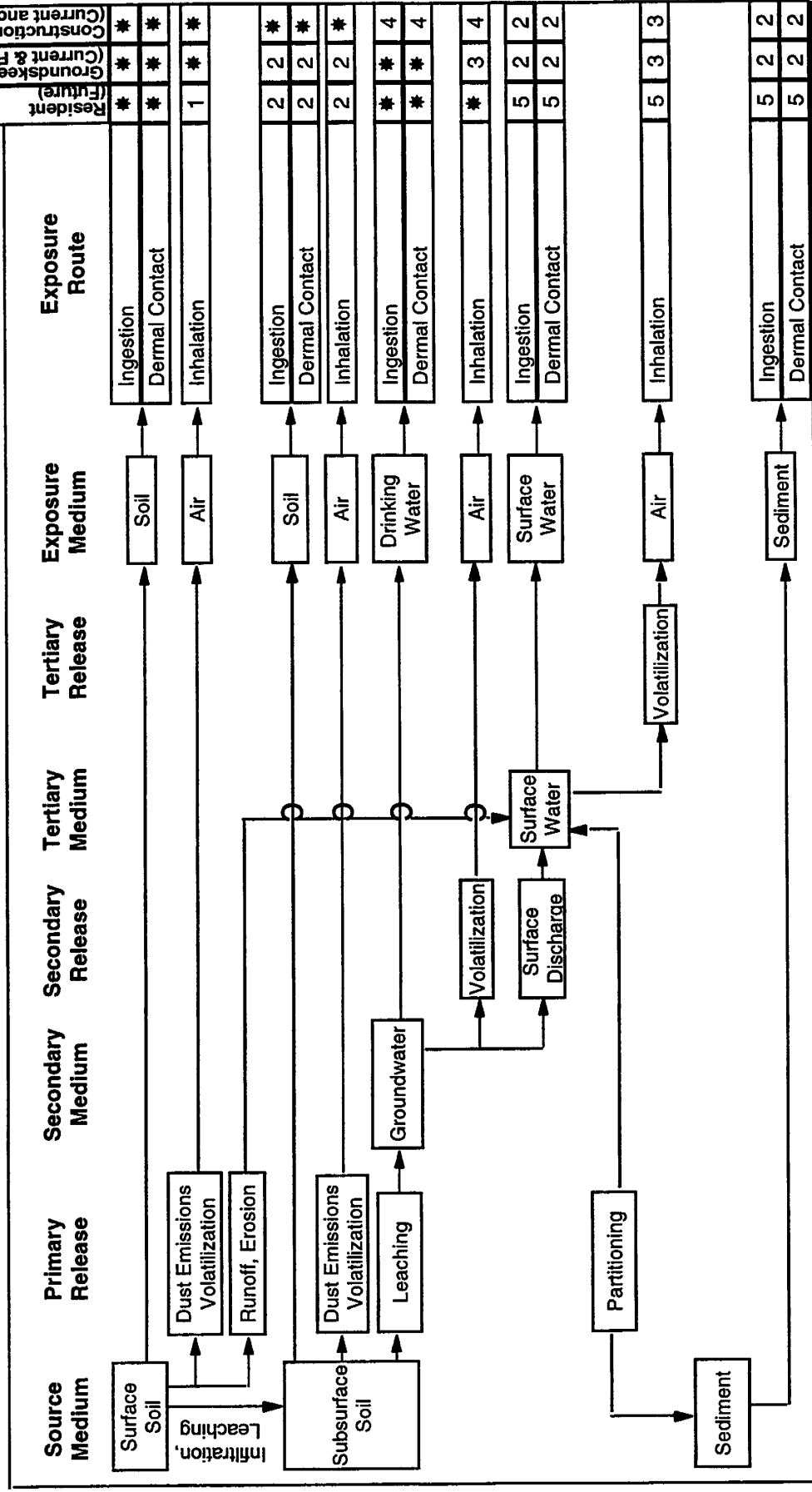
3.4.2 Data Types and Quality

Surface and subsurface soil, groundwater, surface water, sediment, and depositional soil will be sampled and analyzed to meet the objectives of the SI at the Range 24A, Fog Oil Drum Storage site. Quality assurance/quality control (QA/QC) samples will be collected for all sample types as described in Chapter 4.0 of this SFSP. Samples will be analyzed by EPA-approved SW-846 methods, where available; comply with EPA definitive data requirements; and be reported using hard copy data packages. In addition to meeting the quality needs of this SI, data analyzed at this level of quality are appropriate for all phases of site characterization, remedial investigation, and risk assessment.

3.4.3 Precision, Accuracy, and Completeness

Laboratory requirements of precision, accuracy, and completeness for this SI are provided Section 9.0 of the QAP.

Figure 3-1
Human Health Conceptual Site Exposure Model
for Range 24A, Fog Oil Drum Storage Facility, Parcel 88(6)
Fort McClellan, Alabama



* = Complete exposure pathway quantified in SSSL development.

1 = Volatilization from undisturbed surface soil deemed insignificant; soil is likely to be paved or vegetated, reducing dust emissions to insignificant levels; inhalation pathway not quantified.

2 = Incomplete exposure pathway.

3 = Although theoretically complete, this pathway is judged to be insignificant.

4 = Although theoretically complete, these pathways are not quantified for the construction worker because SSSLs developed for the construction worker would be at least as restrictive.

5 = Although theoretically complete, SSSLs for these pathways are developed only for the recreational site user. SSSLs developed for the recreational site user may be used to estimate risk for this receptor.

4.0 Field Activities

4.1 UXO Survey Requirements and Utility Clearances

Range 24A, Fog Oil Drum Storage, Parcel 88(6) site falls within the “Possible Explosive Ordnance Impact Area” shown on Plate 10 of the FTMC Archive Search Report, Maps (USACE, 1998a). Therefore, IT will conduct unexploded ordnance (UXO) avoidance activities, including surface sweeps and downhole surveys of soil borings.

4.1.1 Surface UXO Survey

A UXO sweep will be conducted over areas that will be included in the sampling and surveying activities to identify UXO on or near the surface that may present a hazard to on-site workers during field activities. Low-sensitivity magnetometers will be used to locate surface and shallow-buried metal objects. UXO located on the surface will be identified and conspicuously marked for easy avoidance. Subsurface metallic anomalies will not be disturbed, and will also be marked for easy avoidance. UXO personnel requirements, procedures, and detailed descriptions of the geophysical equipment to be used are provided in Chapter 4.0 and Appendices D and E of the approved SAP (IT, 1998a)

4.1.2 Downhole UXO Survey

During the downhole sampling activities, a downhole UXO survey will be performed to determine if buried metallic objects are present. UXO monitoring, as described in Chapter 4.0 of the SAP (IT, 1998a), will continue until undisturbed soils are encountered or the borehole has been advanced to 12 feet below ground surface, whichever is reached first.

4.1.3 Utility Clearances

After the UXO surface survey has cleared the area to be sampled and prior to performing any intrusive sampling, a utility clearance will be performed at all locations where soil and groundwater samples will be collected, using the procedure outlined in Section 4.2.6 of the SAP. The site manager will mark the proposed locations with stakes, coordinate with the FTMC installation to clear the proposed locations for utilities, and obtain digging permits. Once the locations are approved (for both UXO and utility avoidance) for intrusive sampling, the stakes will be labeled as cleared.

4.2 Environmental Sampling

The environmental sampling program during the SI at the Range 24A, Fog Oil Drum Storage site includes the collection of four surface soil samples, four subsurface soil samples, four ground-

water samples, three surface water samples, three sediment samples, and one depositional soil sample for chemical analyses. These samples will be collected and analyzed to provide data for characterizing the site to determine the environmental condition of the site and any further action to be conducted at the site.

4.2.1 Surface Soil Sampling

Surface soil samples will be collected from four soil borings installed at the Range 24A, Fog Oil Drum Storage site.

4.2.1.1 Sample Locations and Rationale

The surface soil sampling rationale is provided in Table 4-1. Proposed sampling locations are shown on Figure 4-1. Surface soil sample designations, depths, and required QA/QC sample quantities are listed in Table 4-2. The exact surface soil sampling locations will be determined in the field by the on-site geologist based on actual field conditions.

4.2.1.2 Sample Collection

Surface soil samples will be collected from the upper 1 foot of soil by direct-push technology in accordance with the procedures specified in Section 4.7.1.1 of the SAP. Collected soil samples will be screened using a photoionization detector (PID) in accordance with Section 4.15 of the SAP. Sample containers, sample volumes, preservatives and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP. Sample documentation and chain of custody (COC) will be recorded as specified in Section 4.13 of the SAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.2 Subsurface Soil Sampling

Subsurface soil samples will be collected from four soil borings installed at the Range 24A, Fog Oil Drum Storage site. These soil borings are described in Section 4.2.1 for surface soil sampling.

4.2.2.1 Sample Locations and Rationale

Subsurface soil samples will be collected from the soil borings proposed on Figure 4-1. The subsurface soil sampling rationale is presented in Table 4-1. Subsurface soil sample designations, depths, and required QA/QC sample quantities are listed in Table 4-2. The exact soil boring sampling locations will be determined in the field by the on-site geologist based on actual field observations.

Table 4-1

Sample Locations And Rationale
Range 24A, Fog Oil Drum Storage, Parcel 88(6)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
FTA-88-GP01	Surface soil, subsurface soil, and groundwater	One soil boring and one temporary well will be placed between fence and end of concrete storage facility. Sample data will indicate if the fog oil releases have occurred and contaminated soil exists downgradient of concrete drum storage facility.
FTA-88-GP02	Surface soil, subsurface soil, and groundwater	One soil boring and one temporary well will be placed northwest of concrete storage facility before reaching drainage ditch. Sample data will indicate if the fog oil releases have occurred and contaminated soil exists downgradient of concrete drum storage facility.
FTA-88-GP03	Surface soil, subsurface soil, and groundwater	One soil boring and one temporary well will be placed through the concrete floor of drum storage facility in lower northern section. Sample data will indicate if the fog oil releases have occurred and contaminated soil exists beneath the concrete drum storage facility.
FTA-88-GP04	Surface soil, subsurface soil, and groundwater	One soil boring and one temporary well will be placed outside the fence and north of gravel road near oil/water separator outfall. Sample data will indicate if the fog oil releases have occurred and contaminated soil exists downgradient of concrete drum storage facility.
FTA-88-SW/SD01	Surface water and sediment	Sample location is a potential downgradient sink for potential site-specific chemical (PSSC) from the site. Evidence of PSSC mobility at any point within the site would likely be reflected at this location.
FTA-88-SW/SD02	Surface water and sediment	Sample location is in the drainage ditch at the northwest corner of the Fog Oil Drum Storage facility. Evidence of PSSC mobility from upstream points within the site would likely be reflected in this location.
FTA-88-SW/SD03	Surface water and sediment	Sample location is south and upstream of the Fog Oil Drum Storage facility. This location should be upstream of any influence from the Fog Oil Drum Storage facility.
FTA-88-DEP01	Depositional soil	Sampling location represents a low elevation area where surface water runoff could collect, and potentially percolate into the substratum or deposit suspended or dissolved materials after evaporation.

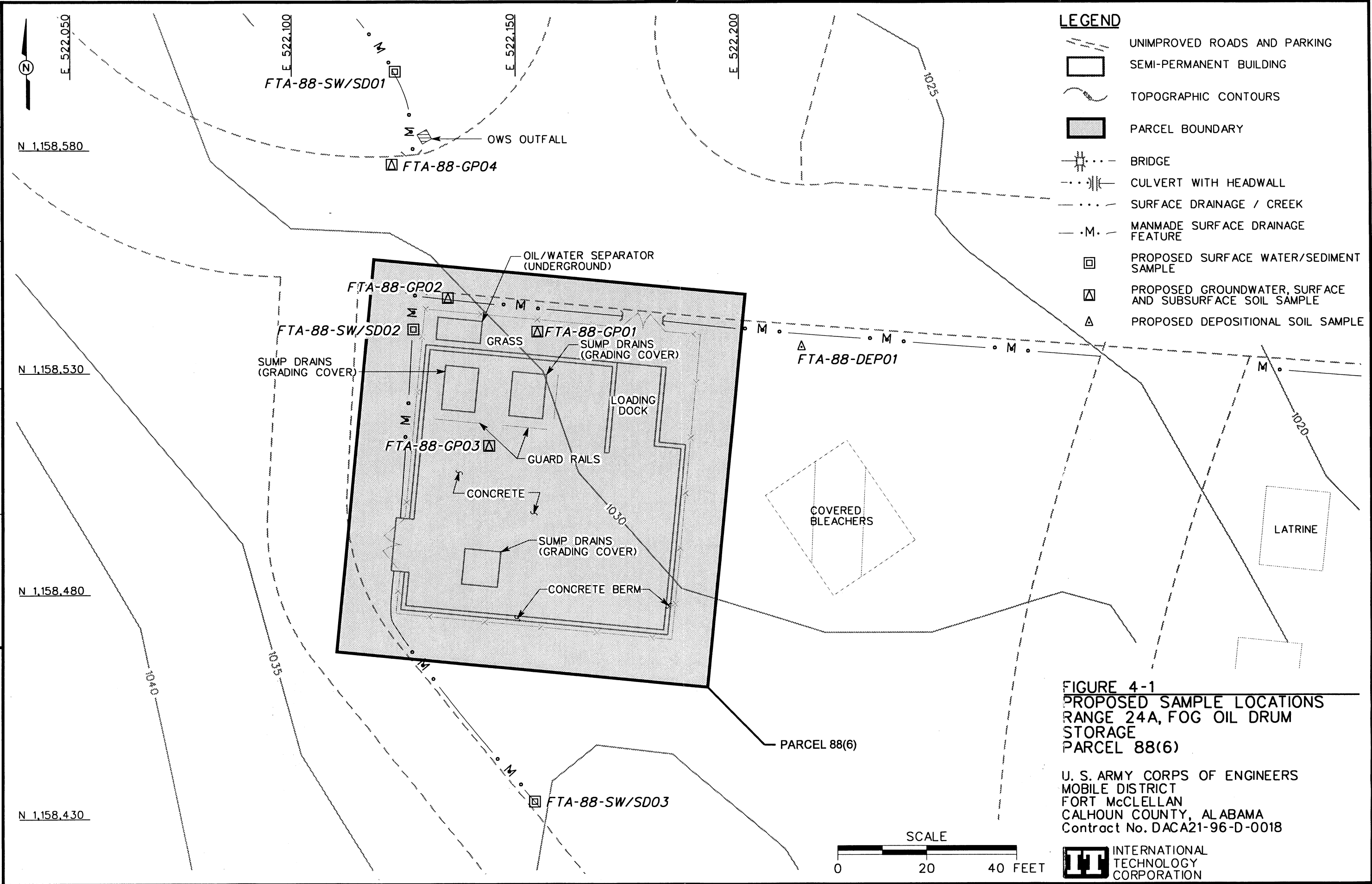


Table 4-2

Soil, Sediment, and Depositional Soil Sample Designations and QA/QC Sample Quantities
Range 24A, Fog Oil Drum Storage, Parcel 88(6)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
FTA-88-GP01	FTA-88-GP01-SS-FR0001-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals
	FTA-88-GP01-DS-FR0002-REG	^a				
FTA-88-GP02	FTA-88-GP02-SS-FR0003-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals
	FTA-88-GP02-DS-FR0004-REG	^a				
FTA-88-GP03	FTA-88-GP03-SS-FR0005-REG	0-1 ^b				TCL VOCs, TCL SVOCs, TAL Metals
	FTA-88-GP03-DS-FR0006-REG	^a				
FTA-88-GP04	FTA-88-GP04-SS-FR0007-REG	0-1	FTA-147-GP04-SS-FR0008-FD	FTA-147-GP04-SS-FR0009-FS		TCL VOCs, TCL SVOCs, TAL Metals
	FTA-88-GP04-DS-FR0010-REG	^a				
FTA-88-DEP01	FTA-88-DEP01-DEP-FR0011-REG	0-1			FTA-88-DEP01-DEP-FR0011-MS FTA-88-DEP01-DEP-FR0011-MSD	TCL VOCs, TCL SVOCs, TAL Metals
FTA-88-SW/SD01	FTA-147-SW/SD01-SD-FR1001-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals, TOC, Grain Size
FTA-88-SW/SD02	FTA-147-SW/SD02-SD-FR1002-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals, TOC, Grain Size
FTA-88-SW/SD03	FTA-147-SW/SD03-SD-FR1003-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals, TOC, Grain Size

^aActual sample depth selected for analysis will be at the discretion of the site geologist and will be based on field observation.

^b Sample will be collected below concrete pad in the first 1 foot of undisturbed soil.

FD - Field duplicate.

FS - Field split.

MS/MSD - Matrix spike/matrix spike duplicate.

N/A - Not applicable.

QA/QC - Quality assurance/quality control.

REG - Field sample.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

TOC - Total organic carbon.

VOC - Volatile organic compound.

4.2.2.2 Sample Collection

Subsurface soil samples will be collected from soil borings at a depth greater than 1 foot bgs in the unsaturated zone. The soil borings will be advanced and soil samples collected using the direct-push sampling procedures specified in Section 4.7.1.1 of the SAP (IT, 1998a).

Soil samples will be collected continuously for the first 12 feet or until either groundwater or refusal is reached. A detailed lithological log will be recorded by the on-site geologist for each borehole. At least one subsurface sample from each borehole will be selected for analyses. The collected subsurface soil samples will be field-screened using a PID in accordance with Section 4.15 of the SAP to measure samples exhibiting elevated readings above background. Typically, the subsurface soil sample showing the highest reading will be selected and sent to the laboratory for analysis. If none of the samples indicate readings above background using the PID, the deepest interval from the soil boring will be sampled and submitted to the laboratory for analyses. Subsurface soil samples will be selected for analyses from any depth interval if the on-site geologist suspects PSSCs at the interval. Site conditions such as lithology may also determine the actual sample depth interval submitted for analyses. More than one subsurface soil sample will be collected if field measurements and observations indicate a possible layer of PSSC and/or additional sample data would provide insight to the existence of any PSSCs.

Sample documentation and chain of custody will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.6 of this SFSP.

4.2.3 Groundwater Sampling

Groundwater samples will be collected from four temporary wells completed in soil borings installed at the Range 24A, Fog Oil Drum Storage site.

4.2.3.1 Sample Locations and Rationale

Groundwater samples will be collected from the locations shown on Figure 4-1. The groundwater sampling rationale is listed in Table 4-1. The groundwater sample designations, depths, and required QA/QC sample quantities are listed in Table 4-3. The exact sampling locations will be determined in the field by the on-site geologist based on actual field conditions.

Table 4-3

Groundwater and Surface Water Sample Designations and QA/QC Sample Quantities
Range 24A, Fog Oil Drum Storage, Parcel 88(6)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
FTA-88-GP01	FTA-88-GP01-GW-FR3001-REG	Water Table ^a				TCL VOCs, TCL SVOCs, TAL Metals
FTA-88-GP02	FTA-88-GP02-GW-FR3002-REG	Water Table ^a				TCL VOCs, TCL SVOCs, TAL Metals
FTA-88-GP03	FTA-88-GP03-GW-FR3003-REG	Water Table ^a				TCL VOCs, TCL SVOCs, TAL Metals
FTA-88-GP04	FTA-88-GP04-GW-FR3004-REG	Water Table ^a	FTA-88-GP04-GW-FR3005-FD	FTA-88-GP04-GW-FR3006-FS		TCL VOCs, TCL SVOCs, TAL Metals
FTA-88-SW/SD01	FTA-88-SW/SD01-SW-FR2001-REG	N/A			FTA-88-SW/SD01-SW-FR2001-MS	TCL VOCs, TCL SVOCs, TAL Metals,
FTA-88-SW/SD02	FTA-88-SW-SD02/SW-FR2002-REG	N/A			FTA-88-SW/SD01-SW-FR2001-MSD	TCL VOCs, TCL SVOCs, TAL Metals
FTA-88-SW/SD03	FTA-88-SW/SD02-SW-FR2003-REG	N/A				TCL VOCs, TCL SVOCs, TAL Metals

^aSample depth will depend on where sufficient first water is encountered to collect a water sample.

FD - Field duplicate.

FS - Field split.

MS/MSD - Matrix spike/matrix spike duplicate.

N/A - Not applicable

QA/QC - Quality assurance/quality control.

REG - Field sample.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

VOC - Volatile organic compound.

4.2.3.2 Sample Collection

Groundwater samples will be collected in accordance with the procedures and methods specified in Section 4.7.1.1 of the SAP. Direct-push temporary wells will be completed in soil borings advanced into the water table (to a depth where sufficient water is encountered) to collect a groundwater sample.

Sample documentation and COC will be recorded as specified in Section 4.13S of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.4 Surface Water Sampling

Three surface water samples will be collected from the small intermittent stream to South Branch of Cane Creek that flows north along the west side of the Range 24A, Fog Oil Drum Storage site.

4.2.4.1 Sample Locations and Rationale

The surface water sampling rationale is listed in Table 4-1. The surface water samples will be collected from the location proposed on Figure 4-1. The surface water sample designations and required QA/QC sample requirements are listed in Table 4-3. The exact sampling locations will be determined in the field by the ecological sampler based on drainage pathways and actual field observations.

4.2.4.2 Sample Collection

Surface water samples will be collected in accordance with the procedures specified in Section 4.9.1.3 of the SAP. Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. The sample will be analyzed for the parameters listed in Section 4.5.

4.2.5 Sediment Sampling

Three sediment samples will be collected from the small intermittent stream to South Branch of Cane Creek that flows north along the west side of the Range 24A, Fog Oil Drum Storage site. The sediment samples will be collected at the same locations as the surface water samples described in Section 4.3.4.

4.2.5.1 Sample Locations and Rationale

The proposed locations for the sediment samples are shown in Figure 4-1. Sediment sampling rationale is presented in Table 4-1. Sediment sample designations and required QA/QC sample requirements are listed in Table 4-2. The actual sediment sample points will be at the discretion of the ecological sampler based on the drainage pathways and actual field observations.

4.2.5.2 Sample Collection

Sediment samples will be collected in accordance with the procedures specified in Section 4.9.1.2 of the SAP. Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP. The sediment samples will be analyzed for the parameters listed in Section 4.5.

4.2.6 Depositional Soil Sampling

One depositional soil sample will be collected downgradient from the Range 24A, Fog Oil Drum Storage site.

4.2.6.1 Sample Locations and Rationale

The depositional soil sample will be collected in the drainage area northeast of the site. The sampling rationale is listed in Table 4-1 and the proposed sampling location is shown on Figure 4-1. The depositional soil sample designation, depth, and required QA/QC sample quantities are listed in Table 4-2. The actual depositional soil sample point will be at the discretion of the ecological sampler based on the physical characteristics of the drainage area and actual field observations.

4.2.6.2 Sample Collection

Depositional soil sample collection will be conducted in accordance with the procedures for surface soil sample collection specified in Section 4.9.1.1 of the SAP. Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5.

4.3 Decontamination Requirements

Decontamination will be performed on sampling and nonsampling equipment to prevent cross-contamination between sampling locations. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.1 of the SAP. Decontamination of nonsampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.2 of the SAP.

4.4 Surveying of Sample Locations

Sampling locations will be marked with pin flags, stakes, and/or flagging, and will be surveyed using either global positioning system (GPS) or conventional civil survey techniques, as necessary to obtain the required level of accuracy. Horizontal coordinates will be referenced to the Alabama State Plane Coordinate System, 1983 North American Datum (NAD83). Elevations will be referenced to the National Geodetic Vertical Datum of 1929 or the North American Vertical Datum of 1988 (soon to be established on site).

Horizontal coordinates for soil, sediment, and surface water locations will be recorded using a GPS to provide accuracy within 1 meter. Because of the need to use temporary wells to determine water levels, a higher level of accuracy is required. Direct-push temporary wells will be surveyed to an accuracy of 0.1 foot for horizontal coordinates and 0.01 foot for elevations, using survey-grade GPS techniques and/or conventional civil survey techniques, as required.

Procedures to be used for GPS surveying are described in Section 4.3 of the SAP. Conventional land survey requirements are presented in Section 4.19 of the SAP.

4.5 Analytical Program

Samples collected at locations specified in this chapter of this SFSP will be analyzed for the specific suites of chemicals and elements based the history of site usage, as well as the EPA, ADEM, FTMC, and USACE requirements. Target analyses for samples collected from the Range 24A, Fog Oil Drum Storage site consist of the following list of analytical suites:

- Target compound list (TCL) volatile organic compounds - Method 5035/8260B
- TCL semivolatile organic compounds - Method 8270C
- Target analyte list metals – Method 6010B/7000.

In addition, the sediment samples will be analyzed for the following list of parameters:

- Total organic carbon – Method 9060
- Grain Size – ASTM D-421/D-422.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 4-4 in this SSFP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with CESAS Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard copy data packages by the laboratory using CLP-like forms. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

4.6 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping will follow the procedures as specified in Section 4.13.2 of the SAP. Completed analysis request/COC records will be secured and included with each shipment of coolers to the following subcontract laboratory:

Sample Receiving
Quanterra Environmental Services
5815 Middlebrook Pike
Knoxville, Tennessee 37921
Telephone: (423) 588-6401.

Split samples collected for the USACE Laboratory will be shipped to the following address:

USACE South Atlantic Division Laboratory
Attn: Sample Receiving
611 South Cobb Drive
Marietta, Georgia 30060
Telephone: (770) 919-5270

4.7 Investigation-Derived Waste Management

Management and disposal of the investigation-derived wastes (IDW) will follow procedures and requirements as described in Appendix D of the SAP. The IDW expected to be generated at the Range 24A, Fog Oil Drum Storage site will include decontamination fluids and disposable personal protective equipment. The IDW will be staged in the fenced area surrounding Buildings 335 and 336 while awaiting final disposal.

4.8 Site-Specific Safety and Health

Safety and health requirements for this SI are provided in the SSHP attachment for Range 24A, Fog Oil Drum Storage, Parcel 88(6). The SSHP attachment will be used in conjunction with the SHP.

Table 4-4

Analytical Samples
Range 24A, Fog Oil Drum Storage, Parcel 88(6)
Fort McClellan, Calhoun County, Alabama

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples			QA/QC Samples *					Quanterra Total No. Analysis	QA Lab Total No. Analysis
				No. of Sample Points	No. of Events	No. of Field Samples	Field Dups (10%)	Spills w/ QA Lab (5%)	MS/MSD (5%)	Trip Blank (1/ship)	Eq. Rinse (1/wk/matrix)		
Range 24A, Fog Oil Drum Storage- Parcel 88(6): 7 Water matrix samples (4 groundwater and 3 surface water); 12 soil matrix samples (4 surface soil, 4 subsurface soil, 3 sediment and 1 depositional soil samples)													
TCL VOCs	8260B	water	normal	7	1	7	1	1	1	2	1	13	1
TCL SVOCs	8270C	water	normal	7	1	7	1	1	1	1	1	11	1
Tot TAL Metals	6010B/7000	water	normal	7	1	7	1	1	1	1	1	11	1
TCL VOCs	8260B	soil	normal	12	1	12	1	1	1	1	1	16	1
TCL SVOCs	8270C	soil	normal	12	1	12	1	1	1	1	1	16	1
TAL Metals	6010B/7000	soil	normal	12	1	12	1	1	1	1	1	16	1
TOC	9060	sediment	normal	1	1	1						1	0
Grain Size	ASTM D-421/D-422	sediment	normal	1	1	1						1	0
Range 24A, Fog Oil Drum Storage Subtotal:												85	6

*Field duplicate, QA split, and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded up to the nearest whole number. Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to:

Quanta Environmental Services
 5815 Middlebrook Pike
 Knoxville, Tennessee 37921
 Attn: John Reynolds
 Tel: 423-568-6401 Fax: 423-584-4315

USACE Laboratory split samples are shipped to:

USACE South Atlantic Division Laboratory
 Attn: Sample Receiving
 611 South Cobb Drive
 Marietta, Georgia 30060-3112
 Tel: 770-919-5270

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

TOC - Total organic carbon.

VOC - Volatile organic compound.

5.0 Project Schedule

The project schedule for the SI activities will be provided by the IT project manager to the BRAC Closure Team on a monthly basis.

6.0 References

Environmental Science and Engineering Inc. (ESE), 1998, *Final Environmental Baseline Survey, Fort McClellan, Alabama*, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

Fort McClellan (FTMC), 1997, *Fort McClellan Comprehensive Reuse Plan*, prepared under contract to the Calhoun County Commission, November.

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U.S. Environmental Protection Agency (EPA), 1993, *Data Quality Objectives Process for Superfund, Interim Final Guidance*, EPA 540-R-93-071, September.